Group 2: Weapon Safe/Arm Identification

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- Purpose
  - Develop safety guidelines, that can be endorsed by various boards, for certification of unmanned system platforms and weapon interfaces
- Issues Addressed
  - TLM’s/Precepts
  - Safety Certification (analysis/testing)
  - Design Guidelines

Assumptions

- Workgroup recognizes the sufficiency of existing STANAG and MIL-STD’s for weapon systems initiation systems.
- Functional contribution of UV subsystems other than the weapon system to the initiation safety system constitutes a distributed safety system. Thus, these contributing UV subcomponents may be safety critical and must be designed, developed and maintained appropriately.
- Top level guidelines apply to all types of weapons – missiles, bombs, guns, directed energy devices, non-lethal systems, etc.

TLM/Precept Comments

- Delete “Results in personnel injury and/or equipment damage…” reference in TLM definitions
  - Want to prevent TLM regardless of result

Top Level Requirements/Guidelines

- New Unmanned Weapon Systems designs shall comply with appropriate design safety requirements of the STANAGs/MIL-STDs for initiation systems.
- UMS subsystems contributing to weapon system initiation safety system, shall not subvert or compromise the independence of weapon system safety features.
- Where UMS subsystems other than the weapon system contribute to the initiation safety system, existing standards and guidelines shall apply to these subsystems.
- Unmanned Weapon Systems shall provide safe armed status response data to the control station.

Top Level Requirements/Guidelines (continued)

- Positive means shall be incorporated to provide isolation of arming and firing power until as late in the firing sequence as operational requirements permit.
- Each weapon/platform shall have unique identifier and shall respond only to commands with its identifier in the command.
- The launching/arm-enable of weapon systems shall require a minimum of 2 independent and unique commands in the proper sequence from external controller (eg.; signals will not originate within launch platform, commands shall not be modified by system processors or components).
- All commands that initiate hazardous activities shall be self-terminating, and upon termination shall return the system to known safe state.

Lower Level Requirements/Guidelines

- The UMS shall be capable of determining the order in which messages were issued. The external control device shall incorporate features that determine the longest time that undelivered messages can exist within the communication system.

Other Considerations

- Incorporation of a safety device that monitors and validates the proper content and sequence of messages and the response of the system to the messages, and takes appropriate safing and notification actions.
- Utilize environmental forces, wherever possible, to enable safety features.
- Electronic Logic Functions. Any electronic logic related to safety functions performed by the distributed UMS initiation safety system shall be embedded as firmware or hardware. Firmware devices shall not be erasable or alterable by credible environments which the UMS would otherwise survive.

Issues

- Specific guidelines need to be developed for different classes of UMS (i.e.; air, sea, ground)
- Stores Management/Fire Control design safety principles need to be integrated into the design of the platform

Summary

- Existing safety standards need to be applied where applicable (e.g. MIL-STD 1901A for rocket motor initiation), but specific standards need to be developed to address different classes of UMS and different types of weapon systems (e.g. guns, directed energy, etc)